2014 Communications Academy

- Antenna Towers - Legal and Construction Requirements

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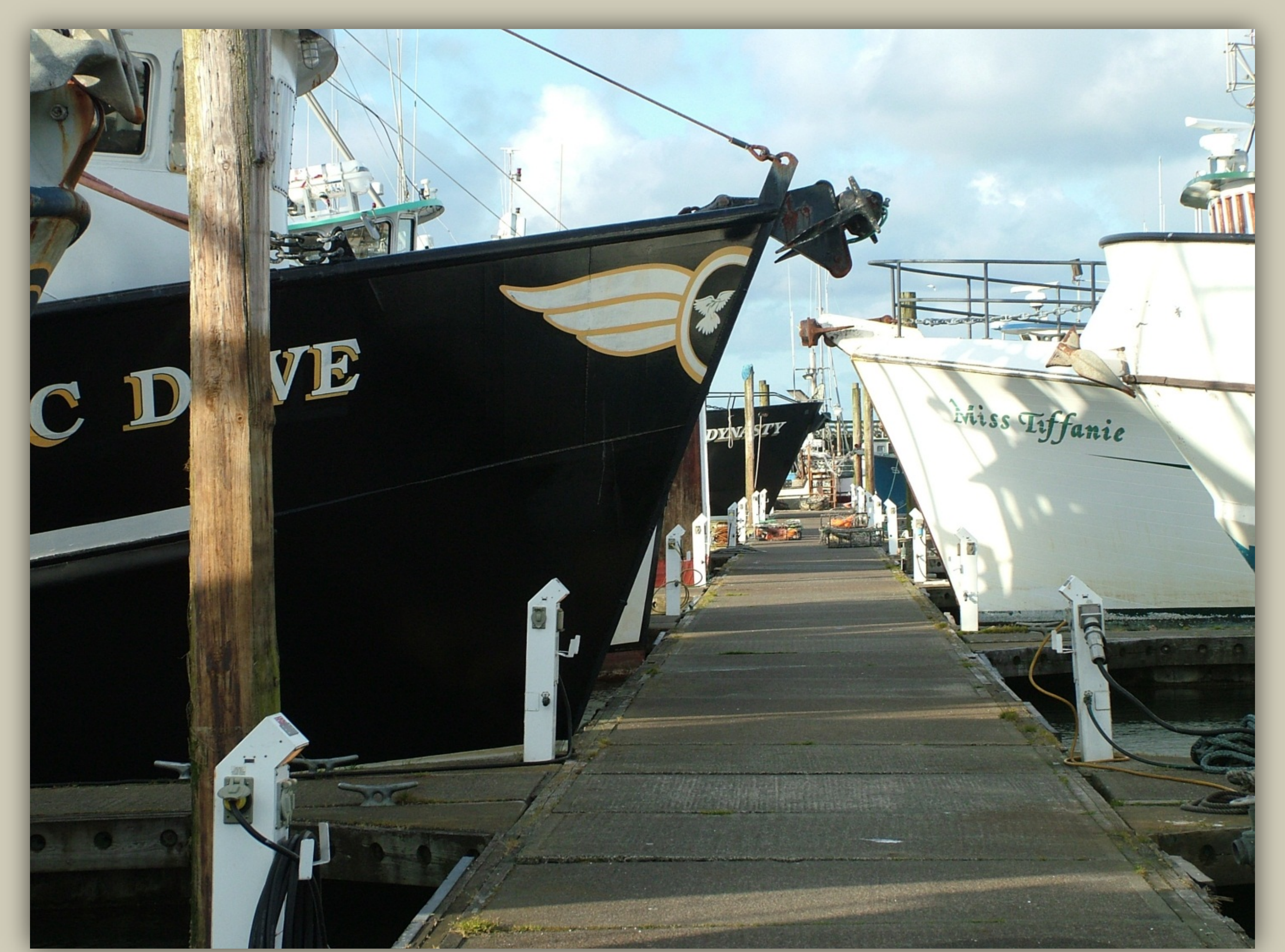
Perspective



Perspective

- This is going to be easy.
- This won’t take long.
- This will be cheap.
- I can do this all by myself.
- If I start tomorrow, it will be ready for that big contest NEXT WEEK.

Perspective

New Perspective

- Some projects are much bigger when you see the whole picture.

New Perspective

New Perspective

- Can I legally construct this project – Zoning.
- Building Permit.
- Engineering.
- Funds to complete.
- Construction Knowledge/Skills.
- Family Support.
- Dedicated Time.
- All of the extras: Coax, Connectors, Grounding ………

Getting Started

- Take time to research the entire project before you start.
- This will save you time.
- This will save you money.
- This will save you frustration.

Antenna Towers

Antenna Towers

Municipal/County Codes

- **Chapter 17.58**
  WIRELESS COMMUNICATION FACILITIES
- Sections:
- 17.58.010 Purpose.
- 17.58.020 Definitions.
- 17.58.025 Permits decision and appeal processes.
- 17.58.030 Exemptions.
- 17.58.040 WCF locations.
- 17.58.050 General provisions.
- 17.58.060 Performance standards.
- 17.58.070 Facility removal.
- 17.58.080 Electromagnetic field (EMF) standards compliance.
- 17.58.090 Application requirements.
- 17.58.100 Minor modifications.
- 17.58.110 *Repealed.*
- 17.58.120 Permit limitations.
- 17.58.130 Fees.
- 17.58.140 *Repealed.*
- **17.58.010 Purpose.**
- This chapter addresses the issues of location and appearance associated with wireless communication facilities (WCF). It provides adequate siting opportunities through a range of locations and options that minimize safety hazards and visual impacts sometimes associated with wireless communications technology. The siting of facilities on existing buildings or structures, collocation of several providers' facilities on a single support structure, and visual mitigation measures are encouraged to maintain neighborhood appearance and reduce visual clutter in the city. This ordinance is subject to periodic review and revision in accordance with the comprehensive plan. (Ord. 1383 § 1, 1998).

Municipal/County Codes

- Do your research regarding local codes before you start your project.
- There will be one of several outcomes located in the codes.

1. Your project is not allowed in the zoning area that you are requesting.
2. You are permitted to construct your project.
3. Your project is exempt from local codes.

Your Project Is Not Allowed In the Zone

- What are my options?
- Abandon this project and install a different setup.
- Apply for a Conditional Use Permit.
- Work to have the zoning changed in order to allow your desired project.
- Move.
- Build it without a permit. (Not Recommended)

You Are Permitted To Construct Your Project

- Do you need a building permit?
- Obtain an application.
- Research, Research, Research, Research!!
- Fill out a COMPLETED application BEFORE submitting it.
- Include engineering with proper stamps if required.
- Include a copy of the section of the city/county codes allowing your project with your application.

Your Project Is Exempt From Local Codes

- Check to see if it is totally exempt or partially exempt.
- If totally exempt, take a copy of the code to the building department and get confirmation in writing.
- If partially exempt - Follow the same procedures for a permitted structure on the portion requiring a building permit.

Your Project Is Exempt From Local Codes

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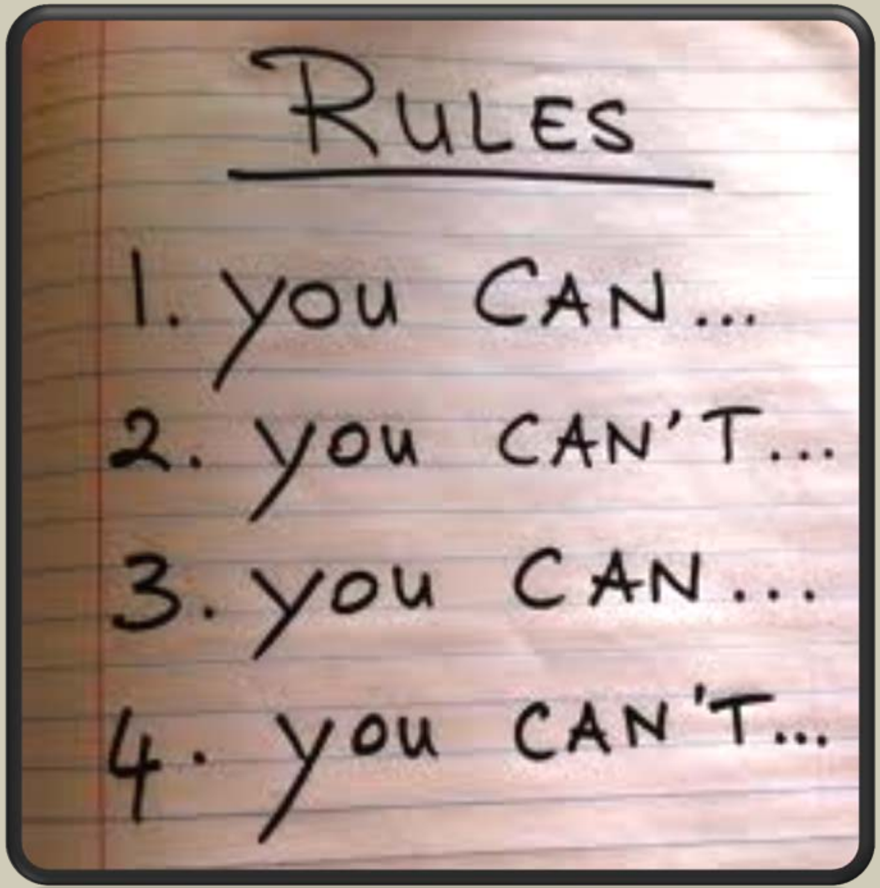
Your Project Is Exempt From Local Codes

- **17.58.030 Exemptions.**
- The following are exempt from the provisions of this chapter and shall be permitted in all zones:
- A. Industrial processing equipment and scientific or medical equipment using frequencies regulated by the FCC.
- B. Antenna(s) and related equipment no more than three feet in height that are being stored, shipped, or displayed for sale.
- C. Facilities used for purposes of public safety, such as, but not limited to, police, hospitals, and the regional 911 system.
- D. Wireless radio utilized for temporary emergency communications in the event of a disaster.
- E. Licensed amateur (ham) radio stations.
- F. Satellite dish antenna(s) less than six feet in diameter, including direct to home satellite services, when used as a secondary use of the property.
- G. Wireless communication facilities which existed on or prior to the effective date of the ordinance codified in this chapter; except that this exemption does not apply to modifications of existing facilities.

Engineering

- The footings and tower will require an up to date engineering (wet) stamp on all plans submitted.
- The engineering needs to be done for the location of the building site.
- Engineering can be obtained for new towers from the manufacture.
- Engineering can be obtained for some used towers but is much harder and more expensive.

Homeowners Association



RULES

1. you CAN...
2. you CAN'T...
3. you CAN...
4. you CAN'T...

Homeowners Association

- Is my property located in a Homeowners Association?
- Do my covenants prohibit me from installing a tower and/or visible antennas?
- Research your covenants for exact wording governing your project.
- Will the homeowners association approve a modest antenna?
- If yes, erect antenna to their specifics; operate low power.
- If no: make presentation before homeowners association.
- Emphasize public service. (Emergency Communications)
- Address concerns about RFI and aesthetics.

Permits

- In most cases you will need a permit.
- If not for the tower, for the base.
- The permitting process is used to ensure compliance of zoning standards and to ensure it is constructed in accordance to proper building standards.
- The building inspector will conduct inspections along the process to confirm everything is done properly.

Permits

What Is Needed For The Permit

- Everything you need will be documented in the building permit packet.
- This includes:

1. Site Plan,
2. Engineering,
3. Construction Details,
4. Foundation Plan ------

What Is Needed For The Permit

- **Chapter 19.14 SINGLE-FAMILY RESIDENTIAL (SFR) DISTRICT**
- Sections:
- 19.14.010 Purpose.
- 19.14.020 Permitted uses.
- 19.14.030 Accessory uses.
- 19.14.040 Conditional uses.
- 19.14.050 Development standards.
- 19.14.060 Performance standards.
- **19.14.010 Purpose.**
- This zoning district is intended to provide for a restful, single-family residential neighborhood. (Ord. 1317 § 3, 1998).
- **19.14.020 Permitted uses.**
- Permitted uses in the SFR district are:
- A. Single-family dwelling;
- B. The growing and harvesting of agricultural crops and a roadside stand for the sale of crops grown on-site;
- C. Nonmotorized recreational trail or passive recreational park with no permanent on-site staff;
- D. Necessary public or quasi-public utility building, structure or equipment, unstaffed and less than or equal to 500 square feet in gross floor area. Excludes substations. (Ord. 1317 § 3, 1998).
- **19.14.030 Accessory uses.**
- Accessory uses in the SFR district are:
- A. Accessory dwelling unit (see Chapter 19.80 FMC);
- B. Family day-care provider's home facility (see Chapter 19.68 FMC);
- C. Home occupation (see Chapter 19.68 FMC);
- D. Microcell for residential use. Excluded from front yard;
- E. Amateur and citizen band transmitter, support structure and antenna array (see FMC 19.68.020 (B)

What Is Needed For The Permit

- **19.68.020 Development standards.**
- Specific lot area, dimension, setback and height limits are described below:
- B. Setbacks.
- 1. Measurement. All setbacks shall be measured perpendicular to the nearest property line. Yards shall be parallel to and measured perpendicular from the applicable property line. See FMC 19.68.040 for setback and yard determination.
- 2. Setback Reduction.
- a. Residential Front Yard. A front yard setback may be decreased by up to six feet based on the following: for each one foot of front yard setback reduction a corresponding one-foot increase for each of the interior setbacks is required. If the total length of the interior lot line(s) is less than the applicable front lot line, then a secondary front yard setback shall be increased as described in this subsection.

(Continued)

Do I Have To Get A Permit?

- If your jurisdiction requires a permit, you need a permit.
- Building without a permit may result in having to take down the tower.
- May result in fines.
- Building out of codes will almost always result in removal of the tower and foundation and possible fines.
- All it takes is one neighbor making a phone call or the Code Enforcement Officer filing a report.

Tower Condition
New or Used

- My friend has a tower he says I can have for free.
- This will save me tons of money.
- I saw a tower in the classifieds, what a deal.
- New towers cost so much money.
- It only has a little rust.
- Should be easy to straighten up.
- Is this really a good deal?
- How much is it really going to cost me to fix it.
- Can I get engineering?

Tower Condition
New or Used

- New tower is complete and no repairs.
- It will cost more to start, but maybe less than extensive repairs to a used tower.
- You know the total tower cost up front.
- May be a structurally better tower.
- Engineering is available upon purchase.
- You know what you are getting.

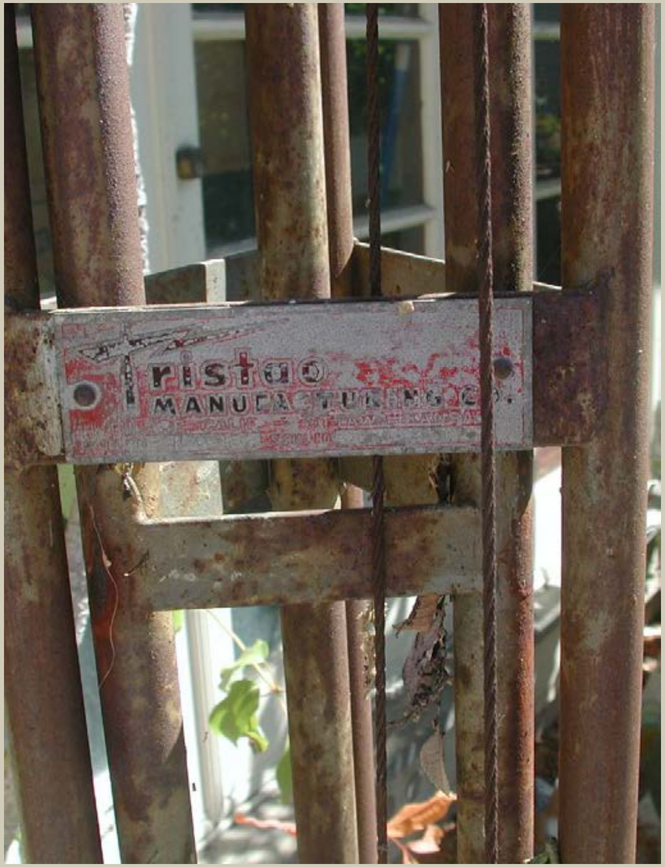
Tower Condition
New or Used

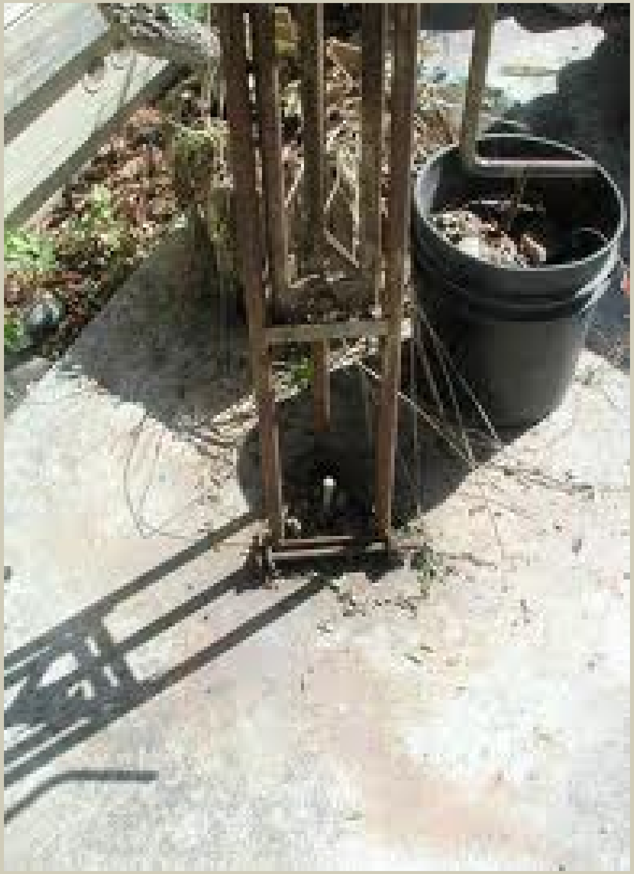
- New towers are a safe purchase.
- If research is done first, a good used tower may be a safe purchase.
- Know what you are getting into, before you get into it.
- This may save you a great deal of money.
- This will create a good experience and help avoid a disaster.

Tower Condition
New or Used

Tower Condition
New or Used

Actual Estate Sale Photos





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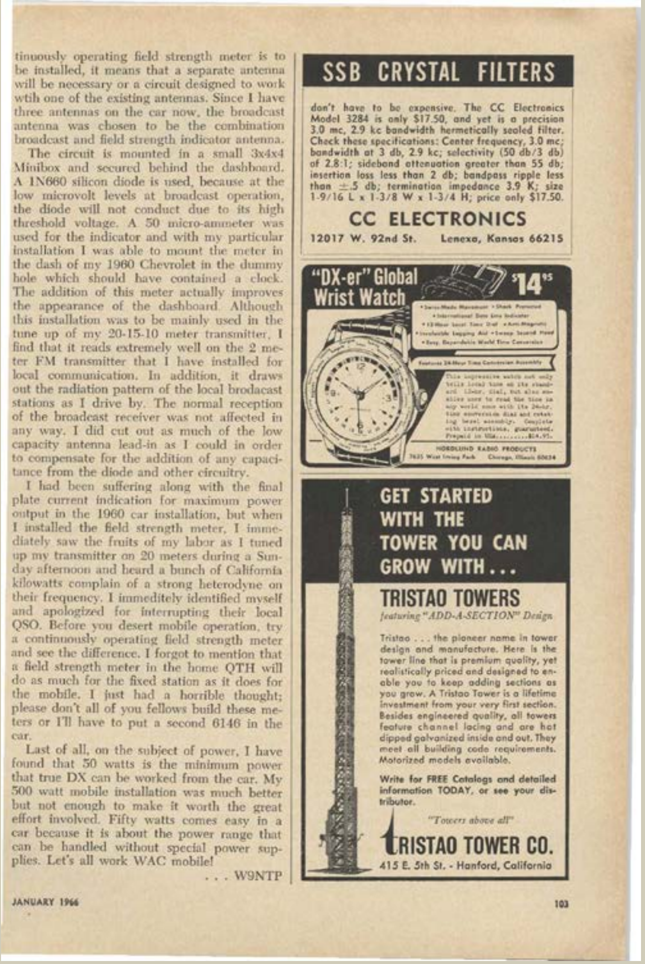

tinuously operating field strength meter is to be installed, it means that a separate antenna will be necessary or a circuit designed to work wtih one of the existing antennas. Since I have three antennas on the car now, the broadcast antenna was chosen to be the combination broadcast and field strength indicator antenna.

The circuit is mounted in a small 3x4x4 Minibox and secured behind the dashboard. A 1N660 silicon diode is used, because at the low microvolt levels at broadcast operation, the diode will not conduct due to its high threshold voltage. A 50 micro-ammeter was used for the indicator and with my particular installation I was able to mount the meter in the dash of my 1960 Chevrolet in the dummy hole which should have contained a clock. The addition of this meter actually improves the appearance of the dashboard. Although this installation was to be mainly used in the tune up of my 20-15-10 meter transmitter, I find that it reads extremely well on the 2 meter FM transmitter that I have installed for local communication. In addition, it draws out the radiation pattern of the local brodacast stations as I drive by. The normal reception of the broadcast receiver was not affected in any way. I did cut out as much of the low capacity antenna lead-in as I could in order to compensate for the addition of any capacitance from the diode and other circuitry.

I had been suffering along with the final plate current indication for maximum power output in the 1960 car installation, but when I installed the field strength meter, I immediately saw the fruits of my labor as I tuned up my transmitter on 20 meters during a Sunday afternoon and heard a bunch of California kilowatts complain of a strong heterodyne on their frequency. I immeditely identified myself and apologized for interrupting their local QSO. Before you desert mobile operation, try a continuously operating field strength meter and see the difference. I forgot to mention that a field strength meter in the home QTH will do as much for the fixed station as it does for the mobile. I just had a horrible thought; please don't all of you fellows build these meters or I'll have to put a second 6146 in the car.

Last of all, on the subject of power, I have found that 50 watts is the minimum power that true DX can be worked from the car. My 500 watt mobile installation was much better but not enough to make it worth the great effort involved. Fifty watts comes easy in a car because it is about the power range that can be handled without special power supplies. Let's all work WAC mobile!

. . . W9NTP

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- Tower Fittings
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- Coax Connectors

Tower Costs

- Antennas
- Lightning Protection
- Coax Grounding
- Tower Grounding
- Coax Supports
- Rotor
- Rotor Cable
- Pumper Truck
- Crane

Tower Costs

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Tower Costs

Tower Costs

Tower Costs

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Tower Costs

Tower Costs

Can I do it or do I need a contractor?

Can I do it or do I need a contractor?

- If the answer is yes, I have listed some of the items you will need to address depending on your job size.

1. How to research your local codes and complete a building permit.
2. How large a tower am I allowed.
3. Can I prepare a hole for the foundation.
4. Can I build the rebar cage.
5. Have I worked with concrete before.
6. Do I need a pumper truck. (May take several pours)

Can I do it or do I need a contractor?

7. Can I assemble the tower.
8. Have I worked with a crane before.
9. Can I climb a tower and do I have the proper safety equipment.
10. Do I know how to install antennas and do I have the proper tools to do so.
11. Can I install coax ends.

Can I do it or do I need a contractor?

Can I do it or do I need a contractor?

- Researching the project very thoroughly from the beginning is critical to a successful project.
- Staying within one's ability and NEVER cutting corners is also critical to everyone's safety.
- Building your own tower or helping build a tower for a repeater, club, friend, ..., can be very rewarding and fun.
- Besides, the view can be great from up top!

Can I do it or do I need a contractor?

Can I do it or do I need a contractor?

Wearing a Full Safety Harness and tied in.

Insurance

- Insurance is needed for several reasons.

1. Protect your assets.
2. Protect your investment (tower).
3. Peace of mind.

- Keep your insurance company updated on your tower.
- Be very specific regarding what is covered, the limits and get it in writing.

Working With The Neighbors

Working With The Neighbors

- Some neighbors are afraid you are going to destroy their TV and radio enjoyment.
- Some just don’t like the looks of a tower.
- Some don’t like change.
- You neighbor may be afraid it will fall over if it is close to their house.
- There are actions you can take to minimize these concerns.

Working With The Neighbors

- Keep the neighbors informed. Some may become interested in the hobby as a result.
- Let them know it is has gone through the permit process and is being inspected for safety.
- Help educate them on RFI and help resolve issues if any.
- Keep all unnecessary items off the tower, (such as flashing lights when not required) to soften the visual impact.

The End